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Unequal Landscapes of Tourism-Led Development: Lessons from West Manggarai, Indonesia

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Abstract. *This study examines whether tourism-led regional transformation in West Manggarai, one of Indonesia's super-priority tourism destinations, has generated spatially inclusive poverty reduction. Drawing on broader debates about tourism-led development, uneven geographical development, enclave economies, and spatial justice, the study investigates whether tourism-related economic growth has translated into geographically distributed livelihood improvements. Using village-level poverty data from 169 villages for 2022 and 2024, the study applies Global Moran's I and Anselin's Local Moran's I to identify spatial autocorrelation and local poverty cluster dynamics. The findings reveal significant positive spatial autocorrelation of poverty in both years, confirming the persistence of High-High and Low-Low clusters. However, changes in poverty between 2022 and 2024 were not spatially significant, indicating that poverty reduction processes remained fragmented rather than spreading systematically across neighboring villages. These results demonstrate that tourism-led growth does not automatically generate inclusive welfare outcomes; instead, development benefits remain territorially selective and are shaped by unequal access to human, physical, financial, social, and natural capital. By integrating spatial statistics with the Sustainable Rural Livelihood Approach (SRLA), this study contributes to global discussions on tourism and poverty by showing how internationally promoted destinations can simultaneously experience economic growth and persistent localized poverty. The findings highlight the importance of place-based poverty reduction strategies, stronger rural–tourism linkages, targeted interventions in persistent High-High clusters, and continuous spatial monitoring to achieve more equitable regional transformation.*

Keywords: *Poverty, Tourism-Led Development, Spatial Autocorrelation, Spatial Statistics, Sustainable Rural Livelihoods*

Introduction

Tourism is widely promoted as a catalyst for accelerating economic growth, job creation, and rural transformation, particularly in peripheral regions seeking new development pathways. However, the relationship between tourism expansion and inclusive development remains theoretically contested. Earlier development perspectives emphasize tourism's potential to stimulate local economies through employment generation, infrastructure investment, and market integration. Nevertheless, recent scholarship highlights that tourism-led development may also perpetuate uneven geographical growth when investment, infrastructure, and economic

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opportunities become concentrated in specific locations rather than distributed across surrounding communities (Bianchi & De Man, 2021; Saarinen & Wall-Reinius, 2019). Consequently, contemporary tourism research has shifted from viewing tourism merely as an economic growth strategy to analyzing how its benefits, costs, and opportunities are distributed across territories.

The uneven outcomes of tourism development are closely linked to debates on enclave tourism, spatial inequality, and spatial justice. Tourism enclaves often emerge when investment, infrastructure, and decision-making processes are externally driven, creating growth centers that are weakly integrated with surrounding rural economies (Saarinen & Wall-Reinius, 2019). While enclave development can accelerate economic activity in select locations, it may simultaneously limit the diffusion of benefits to peripheral communities. From a spatial justice perspective, development outcomes depend not only on the availability of economic opportunities but also on how access to mobility, infrastructure, services, markets, and livelihood resources is distributed across different places and social groups (Tomassini & Lamond, 2023). Therefore, tourism-led development should be evaluated not only by its contribution to regional income growth but also by its capacity to reduce territorial inequalities and expand opportunities for marginalized communities.

Recent studies increasingly emphasize that poverty dynamics in tourism regions result from the interaction between economic transformation and uneven spatial conditions. Tourism growth may generate cumulative advantages in locations with stronger connectivity, infrastructure, institutional capacity, and market access, while peripheral villages often experience limited spillover effects due to persistent constraints in human capital, physical infrastructure, financial access, and productive resources (Scheyvens, 2025). This perspective suggests that poverty persistence in tourism destinations is not merely a consequence of insufficient economic growth but also reflects differences in communities' abilities to access and convert development opportunities into sustainable livelihoods. Evidence from community-based rural tourism further demonstrates that the distribution of tourism benefits is strongly influenced by governance arrangements, local participation, and value-chain integration (Adi et al., 2024).

This broader debate suggests that tourism destinations should be analyzed not only as economic spaces but also as social and territorial systems, where different communities possess unequal capacities to engage in transformative processes. Therefore, understanding poverty dynamics in tourism regions requires an approach that integrates spatial analysis with livelihood perspectives. Consequently, the persistence of poverty in tourism destinations cannot be understood solely as a household-level welfare issue but must also be examined as a spatial process shaped by unequal access to development opportunities.

West Manggarai Regency provides a valuable case for examining these debates, as it represents a peripheral region undergoing structural economic transformation. Historically, the regional economy has been predominantly supported by rural-based activities, including agriculture, fisheries, trade, and small-scale services, which continue to serve as important sources of livelihood for many communities. These sectors illustrate the dependence of rural households on local resources and accessibility conditions, while also contributing to variations in livelihood capacity across villages. In recent years, however, the emergence of tourism as a strategic economic sector has significantly reshaped the region's development trajectory.
Labuan Bajo, the regency's primary urban and tourism gateway, has been nationally designated as one of Indonesia's super-priority tourism destinations. Located in the western part of Flores Island in East Nusa Tenggara, Indonesia, West Manggarai boasts significant tourism potential

due to its rich cultural heritage and abundant natural resources. The regency is home to the world-renowned Komodo National Park, which attracts international visitors and increasingly contributes to local economic activities (Sianipar & Suryawa, 2024). The designation of Labuan Bajo as a super-priority tourism destination has accelerated investment, infrastructure development, service-sector expansion, and economic restructuring. Consequently, tourism has become a strategic driver of regional transformation by enhancing employment opportunities, market accessibility, infrastructure provision, and local economic activities. However, the expansion of tourism also raises important questions about whether these benefits are distributed evenly across villages or remain concentrated in areas with stronger connections to tourism centers.

Despite the economic benefits brought by tourism, poverty remains a critical issue and is spatially uneven across the region, with significant disparities between urban and rural areas (Mahadevan et al., 2021). Many villages in West Manggarai continue to experience limited access to basic infrastructure, healthcare, and education, further exacerbating economic inequalities (Damai & Aprianti, 2024). This pattern aligns with evidence from Labuan Bajo, which shows that spatial inequalities are reinforced by inadequate infrastructure, seasonal water scarcity, land-use conflicts, and limited access to markets and financial capital, leaving some peripheral communities marginalized from emerging economic opportunities (Gai et al., 2026). This situation highlights the potential for a development paradox, where tourism expansion and regional economic growth coexist with persistent poverty in areas disconnected from tourism-related opportunities.

Several factors influence poverty in West Manggarai, including limited employment opportunities outside the tourism sector, geographic isolation, and vulnerability to environmental changes such as droughts and extreme weather conditions (Hacker, 2019). These challenges necessitate a spatial analysis approach to better understand the distribution of poverty across the regency and to identify clusters of high and low poverty concentrations (Putri et al., 2022). Studies have demonstrated that spatial econometric methods, such as Moran's I and Anselin Local Moran's I, are effective tools for analyzing spatial clustering patterns and regional disparities (Kamenetsky et al., 2019; Munibah & Widjaja, 2018). These techniques enable researchers to identify localized poverty clusters and assess the spatial effectiveness of poverty-reduction strategies.

Recent studies emphasize the importance of spatially targeted policies to address rural poverty, particularly in regions with diverse economic activities, such as West Manggarai (Harsiana et al., 2021). The regency's economy is increasingly influenced by national strategic projects aimed at boosting tourism and infrastructure development (Sebayang & Sebayang, 2020). However, gaps in policy implementation often marginalize rural communities, underscoring the need for a more integrated approach that includes economic diversification, education, and sustainable rural development (Imai et al., 2017; Salim, 2005).

Previous studies on West Manggarai have primarily focused on tourism growth, destination development, infrastructure investment, and economic opportunities. However, limited attention has been given to whether tourism-led transformation has resulted in spatially inclusive poverty reduction across villages. A key unresolved question remains: why do some villages continue to experience persistent poverty despite being located in a region undergoing rapid tourism and infrastructure development? Additionally, why do the benefits of economic transformation fail to diffuse evenly across different areas? Existing poverty studies rarely integrate spatial clustering analysis with livelihood-based explanations for unequal development outcomes.

Addressing this gap, this study develops an integrated analytical framework that combines uneven development theory, spatial justice, and the Sustainable Rural Livelihood Approach (SRLA). The uneven development perspective explains why tourism growth poles, such as Labuan Bajo, may generate cumulative advantages in specific locations, while peripheral villages remain disconnected from emerging opportunities. Spatial justice further extends this argument by emphasizing that development outcomes depend on the territorial distribution of infrastructure, public services, markets, and economic opportunities.

The Sustainable Rural Livelihoods Approach (SRLA) complements these perspectives by elucidating the livelihood mechanisms that underlie unequal development outcomes. It offers a valuable framework for analyzing poverty dynamics through a multidimensional lens, considering access to assets, institutional support, and economic resilience (Leek, 2023). Unlike approaches that primarily interpret poverty as income deficits, SRLA emphasizes that livelihood outcomes depend on communities' access to and ability to utilize five forms of capital: human, social, natural, physical, and financial (Chambers & Conway, 1992; Scoones, 1998). In tourism regions, these livelihood assets determine whether communities can engage in emerging economic opportunities or remain excluded from regional transformation.

This study advances current debates on tourism development in two significant ways. First, it challenges the assumption that tourism-led growth automatically leads to inclusive poverty reduction by demonstrating that economic transformation can coexist with persistent spatial poverty when livelihood capacities remain unevenly distributed. Second, it extends the Sustainable Rural Livelihoods Approach (SRLA) by moving beyond household-level livelihood analysis to adopt a territorial perspective that links livelihood assets with measurable village-level poverty patterns. This integration provides a more robust explanation for why similar tourism-driven growth processes may yield varying poverty outcomes across different locations. In this study, we assess the sustainability of poverty alleviation efforts in West Manggarai and examine whether current policies address the long-term needs of impoverished communities (van Nimwegen, 2017). Furthermore, previous research has emphasized the importance of local economic empowerment and sustainable livelihood strategies in mitigating long-term poverty risks (Peng et al., 2022).

The perspective of uneven development helps explain why growth poles, such as Labuan Bajo, may generate cumulative advantages in certain areas while bypassing others. A spatial justice approach shifts the analytical focus from aggregate economic growth to the territorial distribution of development opportunities. The Sustainable Rural Livelihoods Approach (SRLA) provides a crucial analytical link between spatial inequality and poverty dynamics by explaining how differences in livelihood assets affect communities' ability to participate in and sustain the benefits of regional transformation. Therefore, the central research question addressed in this study is whether tourism-led regional transformation in West Manggarai has resulted in spatially inclusive poverty reduction or whether economic growth remains concentrated in better-connected areas while peripheral villages continue to face structural disadvantages. Addressing this issue requires understanding not only where poverty clusters occur but also why these patterns persist and how place-based strategies can improve the distribution of development benefits. This paper aims to analyze the spatial autocorrelation of poverty in West Manggarai Regency in 2022 and 2024 and to examine changes over this period using Global Moran's I and Anselin Local Moran's I. Additionally, the study integrates findings from the SRLA to evaluate the sustainability of poverty reduction strategies. The results of this research will contribute to policy recommendations for targeted poverty alleviation and regional development planning, ensuring that interventions are more spatially and contextually relevant.

Methodology

Study Area

West Manggarai Regency was purposively selected because it represents a theoretically relevant case of a peripheral rural region undergoing rapid tourism-led transformation. The designation of Labuan Bajo as one of Indonesia's super-priority tourism destinations has accelerated investment, infrastructure development, and service-sector growth, while many surrounding villages continue to depend on agriculture, fisheries, and other rural livelihoods. This coexistence of a tourism growth centre and a less-connected rural hinterland provides an appropriate setting for examining whether tourism-generated growth produces geographically diffused welfare improvements or instead reinforces uneven development and enclave-like patterns.

The case is therefore analytically important for linking tourism-led development, uneven geographical development, spatial justice, and the Sustainable Rural Livelihood Approach (SRLA). Differences in connectivity, infrastructure, service access, markets, and livelihood assets across villages may influence their ability to convert regional growth into poverty reduction. Examining all of 169 villages in 12 sub-districts in West Manggarai Regency consequently allows this study to assess poverty not only as an aggregate welfare condition, but as a spatially differentiated development outcome. In this sense, West Manggarai provides a strategic empirical setting for testing whether rapid tourism-led transformation in a peripheral region generates spatially inclusive poverty reduction or produces territorially selective benefits, which directly supports the theoretical contribution developed in the Discussion.

Research Design

This study employs a quantitative spatial analysis of village-level poverty using spatial statistical techniques to examine the spatial distribution and dynamics of poverty. The unit of analysis is the village/urban village level, because intra-subdistrict disparities are central to the research question and may be obscured when using higher levels of spatial aggregation. The study follows a spatial analytical framework that integrates Global Moran's I, Anselin Local Moran's I, Geographic Information System (GIS), and the Sustainable Rural Livelihood Approach (SRLA). These methods are applied sequentially to address the research objectives: (1) identifying whether poverty exhibits spatial clustering across villages, (2) locating specific poverty hotspots and spatial disparities, and (3) interpreting the underlying livelihood conditions that explain differences among village clusters (Anselin, 1995; Bivand et al., 2013).

Data Sources and Collection

The main variable analyzed is the village poverty rate for 2022 and 2024. A poverty change variable was constructed by calculating the difference between the 2024 and 2022 poverty rates to identify recent spatial changes in poverty conditions. The poverty data were compiled from official government sources, including Integrated Social Welfare Data (DTKS) from Ministry of Social Affairs, village-level poverty datasets, and local poverty-reduction planning documents. Additional contextual information was collected from PODES data, regional development documents, and government reports to support interpretation of spatial patterns. These contextual variables include infrastructure conditions, education availability, health service access, livelihood structure, accessibility, and tourism-related development. The contextual variables were not directly used to calculate Moran's I and LISA statistics; rather, they were

used as interpretive evidence to explain why particular village clusters demonstrate different poverty characteristics through the SRLA perspective.

Spatial Analysis Methods

The analysis was conducted through three sequential stages. First, descriptive analysis was conducted to examine village-level poverty levels and changes between 2022 and 2024. Second, Global Moran's I was applied to identify the overall spatial pattern of poverty distribution. This analysis determines whether poverty values across villages are spatially clustered, dispersed, or randomly distributed. A positive Moran's I value indicates spatial concentration of similar poverty levels, while values close to zero indicate random spatial distribution (Ord & Getis, 1995).

Third, Anselin Local Moran's I (LISA) was applied to identify the location of specific poverty clusters and spatial outliers. LISA analysis enables the identification of High-High (HH) clusters, representing villages with high poverty surrounded by similarly high-poverty villages, and Low-Low (LL) clusters, representing villages with relatively low poverty surrounded by similar villages. It also identifies High-Low (HL) and Low-High (LH) spatial outliers that represent local deviations from surrounding patterns (Anselin, 1995). The results of Moran's I and LISA were subsequently interpreted through the SRLA framework to understand how differences in livelihood assets contribute to the persistence or reduction of poverty across village clusters. The findings were further discussed in relation to uneven development, enclave tourism, spatial justice, and place-based development.

To support these analyses, Geographical Information Systems (GIS) tools were used for spatial data visualization. GIS mapping facilitated the identification of poverty hotspots and the spatial interpretation of results, providing visual clarity to complex patterns (Longley et al., 2015).

Statistical Validation and Robustness Checks

To ensure the validity and reliability of the spatial analysis, several robustness checks were conducted. Statistical significance was assessed through permutation tests at the 5% significance level. Separate analyses were performed for poverty rates in 2022, poverty rates in 2024, and changes in poverty between 2022 and 2024. Randomization tests and Monte Carlo simulations were applied to verify the statistical significance of Moran's I values and reduce the possibility that observed spatial patterns occurred randomly (Longley et al., 2015). Furthermore, regression analyses were performed to examine the relationships between key socioeconomic variables and the spatial distribution of poverty, providing insight into the structural drivers of deprivation (Fotheringham et al., 2002). Lastly, a comparative analysis of poverty rates from 2022 to 2024 was conducted to highlight emerging trends and to derive implications for policy and planning. GIS visualization was also conducted to examine the consistency of identified poverty clusters and support spatial interpretation.

Sustainable Rural Livelihood Approach (SRLA) Analysis

After identifying spatial poverty clusters, the results were interpreted using the Sustainable Rural Livelihood Approach (SRLA) to explain the broader livelihood conditions underlying spatial differences in poverty. The SRLA framework incorporates five dimensions of capital: human capital (e.g., education and skills), social capital (e.g., social networks and institutions), physical capital (e.g., infrastructure and access to services), financial capital (e.g., income and

household savings), and natural capital (e.g., land and environmental resources). These dimensions are assessed to understand how local livelihood assets influence both the level and trajectory of poverty, and whether recent reductions in poverty are sustainable in the long term (Chambers & Conway, 1992; Scoones, 1998). In this study, SRLA does not function as a separate statistical model but as an interpretive framework that connects observed spatial poverty patterns with differences in village livelihood capacities. Through this approach, the study examines why some villages are better able to participate in tourism and non-tourism economic opportunities, while others remain vulnerable despite broader regional economic transformation.

Result

Poverty Distribution and Change in 2022-2024

Analysis of changes in the poverty rate across 12 subdistricts in West Manggarai Regency between 2022 and 2024 reveals a heterogeneous pattern of socioeconomic dynamics. Several villages experienced significant increases in poverty rates, particularly in Boleng, Welak, Lembor Selatan, and Pacar subdistricts. For instance, Batu Tiga in Boleng recorded the highest increase, with poverty rising by 18.08 percentage points, followed by Ndoso in Ndoso subdistrict (+8.81%) and Loha in Pacar (+7.89%). Villages such as Tiwu Nampar, Beo Sepang, and Golo Kondeng also showed alarming spikes, indicating localized socioeconomic stress (See Figure 1).

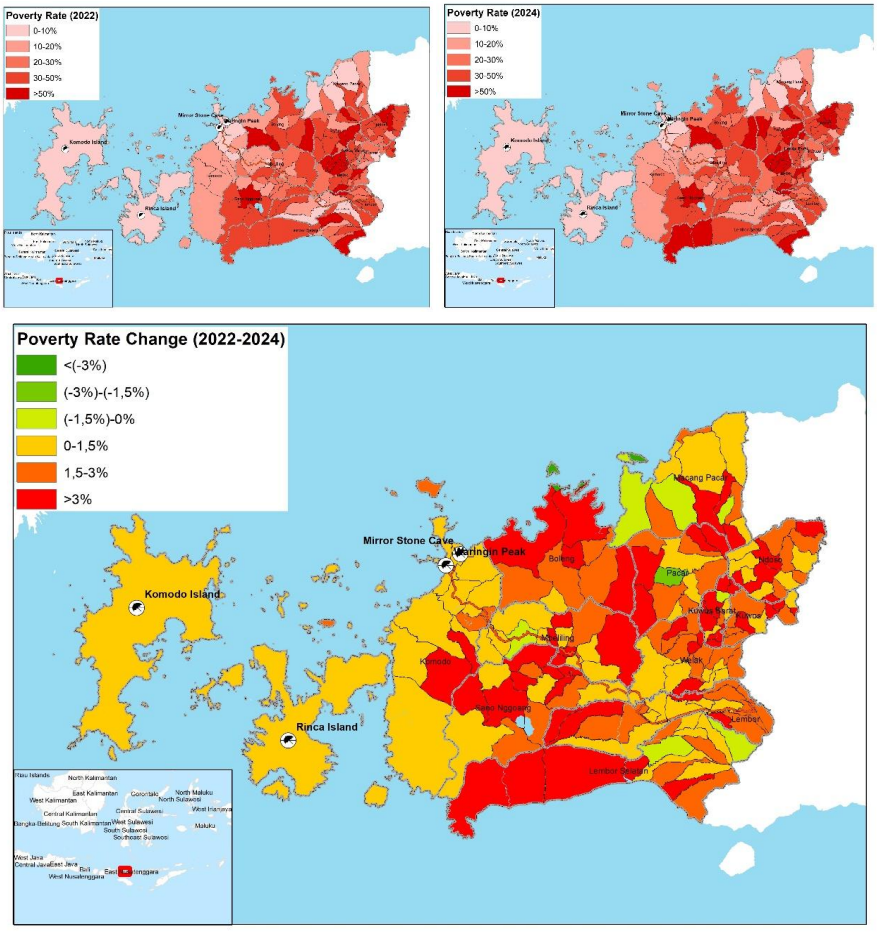

Figure 1. Poverty Rate and Its Change (2022-2024)

By contrast, some villages reported modest or even negative changes. Tanjung Pontianak in Boleng and Watu Rambung in Lembor Selatan experienced slight decreases in poverty rates. This uneven pattern indicates that poverty change was shaped by localized conditions and successful interventions rather than by a single regency-wide trend. A small number of villages, such as Raba and Nanga Kantor Barat in Macang Pacar, reported stable poverty levels (0.00%), which may point to either persistent structural conditions or data anomalies requiring closer examination.

Spatially, upland and inland villages tended to show greater increases in poverty, often surpassing the regency's average. At the same time, coastal or urban-adjacent areas, such as Labuan Bajo, maintained relatively low and stable rates. This spatial disparity likely reflects the territorial concentration of basic infrastructure access, market access, including tourism, and the effectiveness of poverty alleviation programs. Meanwhile, more peripheral villages remain more dependent on agriculture and more exposed to deficits in services and connectivity. These findings underscore the importance of targeted, geographically sensitive interventions, especially in high-burden, worsening areas.

The village-level pattern also reveals a territorial contrast between the tourism-connected core and the wider hinterland. Villages around Labuan Bajo and the Komodo growth corridor benefit from stronger road connectivity, public services, market access, financial services, and tourism employment. By comparison, many inland and upland villages in Welak, Ndoso, Kuwus, Pacar, and Lembor Selatan continue to face constraints in access to safe water, all-season roads, higher education, and productive finance. These differences indicate that the capacity of villages to convert regional growth into livelihood opportunities remains spatially uneven.

Global Moran's I Analysis for Poverty Rate and Its Change in 2022-2024

Global Moran's I is applied to understand the spatial distribution patterns of poverty across villages in West Manggarai. By quantifying the extent to which poverty is spatially clustered or dispersed, this analysis helps identify whether poverty is localized and persistent in certain areas or more randomly distributed. Figure 2 presents the results of the Global Moran's I analysis, which evaluates the overall spatial autocorrelation of poverty rates in West Manggarai for the years 2022 and 2024, as well as the changes between them.

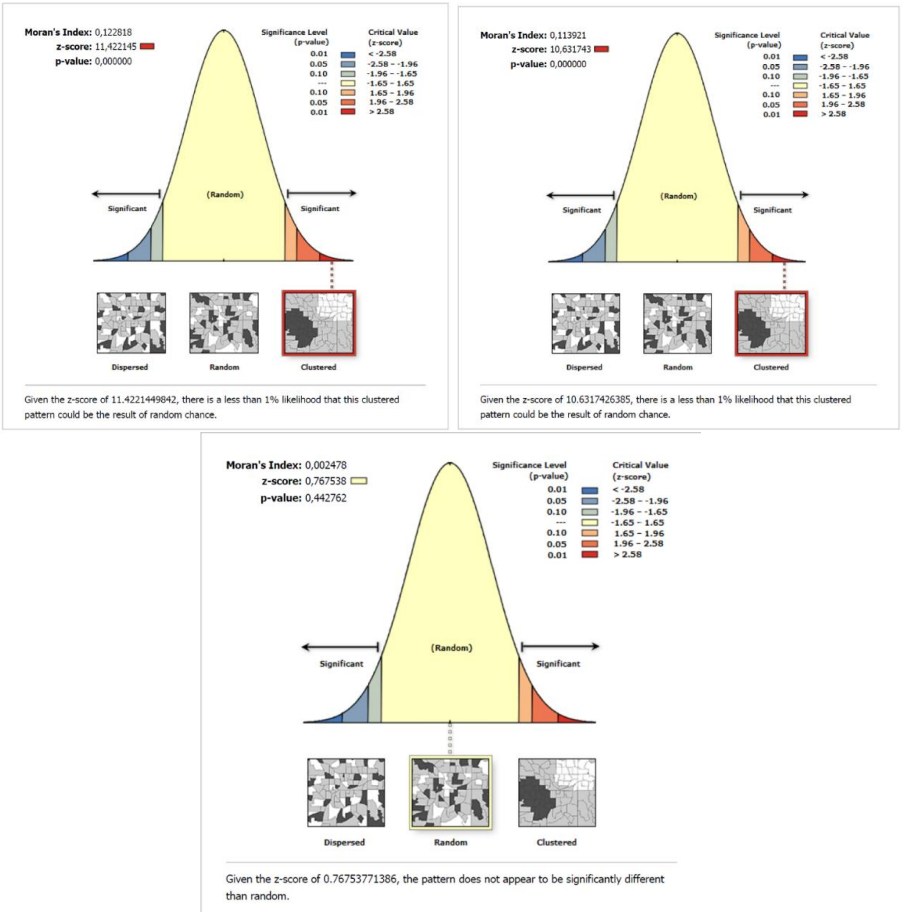

Figure 2. Global Moran's I for Poverty Rate and Its Change (2022-2024). Clockwise from top left: Poverty Rate in 2022, Poverty Rate in 2024, and Change in Poverty Rate (2022–2024).

In 2022, the analysis yielded a Moran's I value of 0.1228, with a z-score of 11.42 and a p-value of 0.000, indicating a statistically significant spatial clustering pattern. This means that villages with high poverty rates were likely to be located near other high-poverty villages, while those with low poverty rates tended to cluster together.

The results for 2024 show a Moran's I value of 0.1139, with a z-score of 10.63 and the same highly significant p-value of 0.000. While the degree of spatial autocorrelation declined slightly from 2022, the persistent clustering indicates that poverty remained spatially concentrated, with limited dispersion or structural change in the spatial pattern of deprivation.

Both values indicate statistically significant positive spatial autocorrelation: villages with high poverty tended to be located near other high-poverty villages, and villages with low poverty tended to be near other low-poverty villages. The slight decline between 2022 and 2024 suggests a modest change in clustering strength, but not a transformation in the underlying geography of poverty.

By contrast, the analysis of changes in the poverty rate between 2022 and 2024 revealed a Moran's I value of 0.0025, with a z-score of 0.77 and a p-value of 0.443, which is not statistically significant. This means that increases or decreases in poverty were spatially fragmented and did not diffuse systematically across neighboring villages. In substantive terms,

the geography of poverty remained structured, but the geography of poverty reduction did not. In other words, increases or reductions in poverty occurred in a spatially random manner, without a discernible geographic pattern (Maniragaba et al., 2023).

These findings imply that while poverty levels themselves remain spatially clustered, the processes of poverty reduction or exacerbation are more idiosyncratic and locally contingent, potentially influenced by village-specific interventions or conditions rather than regional trends.

The contrast between the significant Moran's I values for poverty levels and the non-significant Moran's I for poverty change is important. It indicates that the underlying geography of deprivation remained persistent between 2022 and 2024, even though short-term changes varied among villages. Thus, neighboring villages often shared similar poverty levels, but did not necessarily experience similar trajectories of improvement or deterioration. Structural spatial disadvantage therefore appears geographically embedded, whereas short-term poverty change is more sensitive to village-specific conditions, interventions, shocks, and institutional capacity.

Anselin Local Moran's I Analysis for Poverty Rate and Its Change in 2022-2024

Anselin Local Moran's I was used to identify localized clusters of poverty in 2022. Figure 3 highlights significant Hing-high (HH) clusters were identified in villages such as Golo Lujang and Bangka Lewat, indicating persistent poverty hotspots. Low-low (LL) clusters were observed in Batu Cermin and Gorontalo, signaling localized concentrations of relative advantage. This is noteworthy because Gorontalo and other nearby villages have been recognized within the buffer-zone tourism development area linked to Labuan Bajo, where access to tourism-related infrastructure and services is relatively stronger.

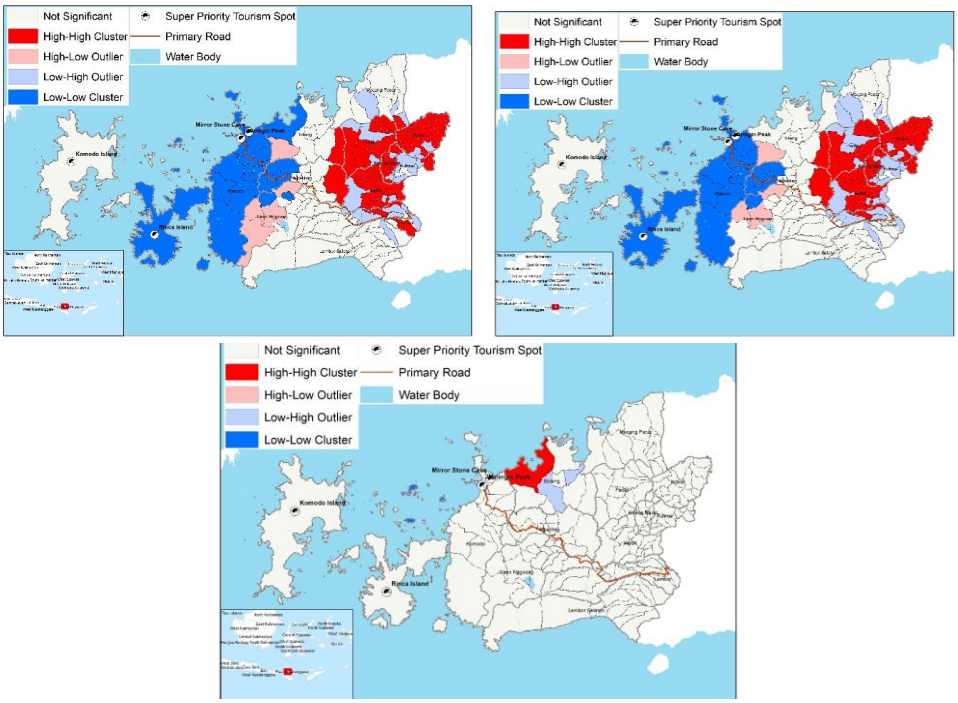

Figure 3. Anselin Local Moran's I for Poverty Rate and Its Change (2022–2024). Clockwise from top left: Poverty Rate in 2022, Poverty Rate in 2024, and Change in Poverty Rate (2022–2024).

Anselin's Local Moran's I analysis is employed to identify statistically significant spatial clusters of poverty in West Manggarai Regency for the years 2022 and 2024, as well as to examine changes in poverty rates over this period. The results are illustrated in Figure 3, which displays three maps arranged clockwise: the 2022 poverty rate, the 2024 poverty rate, and the change in poverty rate between 2022 and 2024.

In 2022, the analysis identified prominent High-High (HH) clusters—areas with high poverty rates surrounded by neighbors experiencing similarly high poverty—in villages such as Desa Golo Lujang and Desa Bangka Lewat. These HH clusters were primarily located in peripheral rural areas characterized by limited accessibility, inadequate infrastructure networks, reduced service availability, and fewer connections to regional economic opportunities. Such conditions may restrict communities' ability to diversify their livelihoods beyond agriculture and other local resource-based activities. In contrast, Low-Low (LL) clusters—areas with low poverty rates surrounded by neighbors with similarly low poverty—were observed in Desa Batu Cermin and Desa Gorontalo, indicating localized zones of relative socioeconomic advantage. These villages are more closely connected to urban services, tourism-related activities, and infrastructure networks associated with Labuan Bajo and its surrounding growth areas. Their spatial position provides greater access to markets, public services, and emerging economic opportunities.

By 2024, the spatial configuration of clusters had shifted. High-high (HH) clusters remained evident in villages such as Golo Lewe and Compang Kules, indicating that poverty hotspots persisted even as the regency continued to develop. Low-low (LL) clusters also persisted or emerged in villages such as Watu Nggelek and Macang Tanggar, suggesting that some areas either maintained or strengthened their socioeconomic resilience. These spatial transitions reflect a combination of effective interventions and areas of stagnation, highlighting the uneven progress of poverty alleviation efforts across the regency (Henninger, 1998).

The persistence of these spatial patterns reflects the differentiated geography of development in West Manggarai. Areas connected to tourism around Labuan Bajo generally exhibit stronger economic linkages, better infrastructure accessibility, and greater exposure to investment flows. In contrast, peripheral villages located farther from growth centers continue to face structural constraints related to transportation connectivity, access to services, and limited livelihood diversification. Therefore, changes in poverty clusters should be interpreted not only as differences in poverty levels but also as variations in the capacity of places to participate in regional transformation.

The third panel of Figure 3 illustrates the spatial clustering of changes in the poverty rate between 2022 and 2024. The LISA map for poverty change during this period reveals fewer local success stories and transition zones. Villages such as Tanjung Boleng and Pantar exhibited positive local autocorrelation in poverty reduction. In contrast, HL and LH outliers indicate spatial mismatches: some villages improved despite being surrounded by less favorable areas, while others worsened even when located near better-performing neighbors. These outliers suggest that policy, institutional capacity, and village-specific livelihood structures play a significant role alongside geographic location. This pattern highlights spatial mismatches, where some formerly low-poverty areas experienced increases in poverty, while some high-poverty villages achieved notable improvements (Wang & Wenping, 2021).

The Local Moran results reinforce this differentiated territorial structure. Persistent high-high (HH) clusters, such as Golo Lujang and Bangka Lewat, occur in areas characterized by weaker

infrastructure, limited market connectivity, and less diversified livelihoods. In contrast, low-low (LL) clusters, such as Batu Cermin and Gorontalo, are located closer to the tourism and service hubs around Labuan Bajo. The persistence of LL areas in Watu Nggelek and Macang Tanggar in 2024 further demonstrates that relative socioeconomic advantage is not confined to the urban core. Conversely, the presence of HH clusters in Golo Lewe and Compang Kules indicates that regional economic expansion has not eliminated localized poverty traps. Overall, the results reveal a core–periphery pattern, where connectivity and access to services are associated with lower poverty, while peripheral locations remain more vulnerable to persistent deprivation.

These results underscore the spatially uneven nature of poverty dynamics in West Manggarai and emphasize the importance of localized, context-sensitive policy interventions. Targeting persistent high-poverty household clusters and reinforcing successful strategies in emerging low-poverty zones could improve the long-term effectiveness of poverty reduction programs (Singh & Chudasama, 2020).

Discussion

This study contributes to broader debates on tourism-led development by demonstrating that economic growth generated through tourism expansion does not automatically result in spatially inclusive development. The West Manggarai case highlights a central tension in tourism-led transformation: destinations can achieve rapid economic visibility and attract investment while simultaneously sustaining localized poverty concentrations. Rather than indicating a failure of growth itself, the findings suggest that the challenge lies in the uneven territorial conversion of growth into sustainable livelihood opportunities.

This finding contributes to the theoretical debate on tourism-led development by demonstrating that growth outcomes are determined not only by the scale of investment or economic expansion but also by the capacity of different places to transform growth opportunities into sustainable livelihoods. In this context, the West Manggarai case provides empirical support for uneven development theory, which posits that economic transformation tends to produce varied outcomes across territories. Moreover, this study extends this perspective by showing that spatial inequality is mediated through unequal livelihood capacities, as conceptualized in SRLA.

The results of this study highlight the persistent spatial clustering of poverty in West Manggarai Regency, as demonstrated by the significant Global Moran's I values in both 2022 and 2024. The presence of High-High (HH) and Low-Low (LL) clusters indicates that poverty is not randomly distributed but reflects underlying spatial processes influenced by variations in accessibility, infrastructure provision, service availability, and economic connectivity (Khan & Sloboda, 2023). These findings align with previous research showing that regional economic disparities and uneven infrastructure development contribute to the geographical concentration of poverty (Liu et al., 2023; Oteng-Abayie et al., 2023).

In West Manggarai, spatial clustering should be understood as the result of differentiated territorial capacities rather than merely differences in poverty levels. Peripheral villages, especially those located in inland and upland areas, often face cumulative disadvantages, including limited transportation connectivity, restricted market access, inadequate basic services, and reliance on agriculture-based livelihoods. These conditions diminish their ability to diversify income sources and engage in emerging economic opportunities. Conversely, tourism-connected areas around Labuan Bajo benefit from stronger

infrastructure networks, closer proximity to service centers, greater market accessibility, and increased exposure to tourism-related investments. These advantages create more opportunities for employment, business development, and participation in regional economic activities. However, the spatial concentration of these benefits also explains why tourism-led transformation has not automatically resulted in convergence across villages.

One key insight from the Anselin Local Moran's I analysis is the identification of persistent High-High poverty clusters, providing evidence that poverty in tourism regions can become spatially entrenched. Villages such as Golo Lujang and Bangka Lewat illustrate how poverty persistence may arise from the interaction of multiple constraints, including limited connectivity, weak service provision, poor infrastructure, restricted economic diversification, and insufficient livelihood assets (Edache & Gaiya, 2024; Ponce et al., 2023). These conditions indicate that poverty concentration is not merely associated with low income levels but reflects structural barriers to accessing the resources necessary for livelihood improvement.

By contrast, the persistence of low-low poverty clusters in Desa Batu Cermin and Desa Gorontalo further underscores the deeply entrenched nature of spatial inequality in the region. These village-level disparities indicate that the benefits of regional transformation are territorially selective. In other words, villages located closer to tourism and service hubs are better positioned to capture the advantages of growth, while more remote villages remain excluded from the main circuits of opportunity. This finding reinforces the argument that spatial poverty in tourism regions should not be viewed merely as a local welfare issue but as a manifestation of broader spatial injustice in access to infrastructure, markets, and development opportunities. From a spatial justice perspective, these patterns reveal unequal access to the conditions necessary to benefit from regional development. Therefore, poverty concentration should be understood as a territorial outcome shaped by unequal opportunities rather than solely the result of individual household characteristics.

These findings also contribute to discussions on enclave tourism. Although Labuan Bajo has become an internationally recognized tourist destination, the spatial concentration of low-poverty clusters around tourism-linked areas indicates that economic benefits have not fully permeated the surrounding rural regions. Consequently, the persistence of poverty clusters suggests that tourism governance should focus not only on destination development but also on establishing institutional and spatial connections between tourism hubs and adjacent rural economies. Strengthening rural–tourism linkages is essential to transform tourism from an isolated growth pole into a catalyst for broader regional development. Achieving such linkages requires not only infrastructure connectivity but also the enhancement of local skills, access to finance, institutional capacity, and participation in tourism value chains.

The persistence of spatial poverty clusters supports the argument of uneven geographical development, which suggests that growth processes tend to generate cumulative advantages in locations with stronger initial conditions, better accessibility, and greater institutional capacity. In West Manggarai, villages connected to Labuan Bajo and tourism-related infrastructure are better positioned to capture economic opportunities, while more peripheral villages remain constrained by limited access to markets, services, and productive resources. This pattern reflects not only differences in poverty levels but also disparities in the capacity of places to participate in regional transformation.

The absence of significant spatial autocorrelation in the change in poverty rates between 2022 and 2024 adds an important dimension to this interpretation. Although poverty itself

remains spatially clustered, changes in poverty did not follow a similarly clear geographic pattern (Gawusu et al., 2026). This suggests that recent poverty reduction efforts have been fragmented and locally contingent rather than diffused across neighboring areas. Such a pattern underscores the complexity of poverty alleviation, indicating that factors beyond spatial proximity—such as policy effectiveness, governance capacity, institutional coordination, and local economic shocks—play a decisive role in shaping poverty outcomes (Liu et al., 2022; Pradhan et al., 2017). In the case of West Manggarai, this means that tourism expansion alone cannot explain changes in village-level welfare. Instead, the extent to which villages benefit from tourism-led growth likely depends on their ability to connect with emerging markets, participate in new economic activities, and leverage public investment sustainably.

These findings suggest that spatially targeted and context-sensitive policies are crucial for effective poverty reduction (Grover et al., 2022; H. Zhang et al., 2022). Instead of treating poverty as a uniform regional issue, policy interventions should address the specific mechanisms that perpetuate disadvantage in different areas. For HH clusters, this involves improving basic accessibility, enhancing human capital, and expanding livelihood opportunities. For LL clusters, policy priorities should emphasize maintaining inclusive growth and ensuring that tourism benefits continue to generate broader regional spillovers. In tourism-connected areas, policies should focus on ensuring that economic growth produces wider local spillovers, while in peripheral villages, interventions should prioritize overcoming structural accessibility barriers.

Traditional one-size-fits-all approaches are unlikely to adequately address the specific needs of persistent household (HH) clusters (Nagel et al., 2024; R.-X. Zhang & Zhang, 2021). Instead, localized interventions should prioritize infrastructure improvements, education and health services, and rural economic empowerment in villages that remain structurally disadvantaged (Kaiser & Barstow, 2022; Yu et al., 2024). Particular attention should be given to strengthening rural–tourism linkages so that tourism does not function as an isolated growth enclave but instead generates broader multiplier effects for surrounding villages. Policies should therefore aim to enhance access to financial capital, vocational training, and market linkages to break the poverty cycle in HH clusters (Boadi et al., 2024). In this context, the findings support a place-based development strategy in which poverty reduction is tailored to the spatial and institutional conditions of different village clusters rather than uniformly applied across the regency.

From a regional planning perspective, these findings underscore the need to move beyond sector-based tourism planning toward integrated territorial planning. Tourism development strategies should not only focus on destination competitiveness and infrastructure provision within growth centers but also consider the spatial relationships between tourism hubs and surrounding rural communities. Strengthening rural–tourism linkages requires coordinated planning of transportation networks, service accessibility, local economic infrastructure, and institutional capacity to enable peripheral villages to participate in regional development processes. The contrast between tourism-connected areas and peripheral villages illustrates that tourism geography plays a crucial role in shaping poverty outcomes. Growth centers such as Labuan Bajo function as nodes of investment, infrastructure, and service concentration, while surrounding rural territories experience varying degrees of connectivity to these opportunities. Therefore, regional planning should emphasize not only strengthening tourism destinations but also enhancing functional linkages between tourism centers and rural production areas.

The integration of the Sustainable Rural Livelihoods Approach (SRLA) extends the analysis beyond spatial patterns by elucidating the livelihood mechanisms that underlie the persistence of poverty. While spatial clustering identifies where poverty is concentrated, SRLA explains why some areas are more capable of escaping poverty than others. Villages with stronger combinations of human, physical, social, natural, and financial capital are more likely to transform tourism-related opportunities into sustainable livelihoods. Conversely, areas with limited livelihood assets may remain excluded, even when situated within a broader region experiencing economic growth.

From an SRLA perspective, villages within persistent household (HH) clusters are likely constrained by weaknesses in human, physical, and financial capital, as well as social capital and access to natural resources. Enhancing human capital through education and skill development, improving access to infrastructure and productive resources, and strengthening social capital through community-based initiatives are therefore crucial for sustainable poverty reduction (Kurniawan et al., 2023). This perspective is important because it shifts the focus from short-term poverty alleviation to the broader question of whether villages possess the capabilities needed to access and retain the benefits of regional transformation. The study thus contributes to the growing literature on spatial econometrics in poverty analysis by demonstrating the usefulness of Moran's I and Anselin Local Moran's I in identifying spatial dependencies, while also showing that SRLA provides a more comprehensive understanding of poverty beyond purely economic indicators by incorporating social and environmental dimensions (Leone et al., 2024). These insights can inform future research on the intersections among spatial analysis, tourism-led development, and sustainable rural transformation, especially in regions where economic growth is concentrated but social benefits remain unevenly distributed.

Therefore, this study positions SRLA not only as a framework for understanding household livelihood strategies but also as a territorial analytical framework for explaining why some villages are better able to capture the benefits of regional transformation than others. Integrating SRLA with spatial econometrics enables a more comprehensive understanding of poverty persistence by linking where poverty occurs with why some places remain vulnerable despite broader economic growth.

These findings also contribute to regional planning discussions by demonstrating that spatial inequality is not only a socioeconomic outcome but also a significant planning challenge. The persistence of household poverty clusters indicates that regional development policies must consider differentiated territorial conditions rather than relying on uniform interventions. Integrating spatial evidence with livelihood analysis provides a foundation for designing place-based planning strategies that align tourism development, infrastructure investment, and rural livelihood improvement. By combining spatial econometrics and Sustainable Rural Livelihood Analysis (SRLA), this study contributes to the literature in three key ways. First, it demonstrates that tourism-led development should be evaluated based on spatial distributional outcomes rather than aggregate growth alone. Second, it shows that poverty persistence in tourism destinations is linked to unequal livelihood capacities across different areas. Third, it highlights the value of integrating spatial analysis and livelihood approaches to design place-based poverty reduction strategies in peripheral regions.

Conclusion

This study analyzed village-level poverty in West Manggarai Regency during 2022–2024 and found that poverty remained significantly clustered in space, even as the regency continued to be reshaped by tourism-led development. Persistent HH and LL clusters indicate that poverty is geographically embedded. In contrast, the absence of spatial autocorrelation in poverty change suggests that recent improvements or deteriorations were fragmented and locally contingent.

The paper contributes to wider debates on poverty, rural development, and tourism by demonstrating that tourism-led development should not be evaluated solely through aggregate economic growth, but also through its capacity to transform growth into sustainable livelihood opportunities across territories. The West Manggarai case extends uneven development and spatial justice perspectives by showing that tourism growth can simultaneously generate economic transformation and reproduce localized poverty when access to development opportunities remains spatially unequal. Furthermore, by integrating SRLA with spatial analysis, this study extends livelihood theory from a household-oriented perspective toward a territorial framework that explains how differences in human, social, natural, physical, and financial capital shape communities' ability to participate in regional transformation.

Several policy implications follow. Poverty reduction in West Manggarai should be place-based and cluster-sensitive, with special attention to persistent HH villages. Strengthening transport and digital connectivity, education and health services, local market access, and rural-tourism linkages is as important as promoting tourism itself. Programs should also support livelihood diversification so that households are not forced to depend either on narrowly concentrated tourism circuits or on low-return subsistence activities. From a spatial planning perspective, these findings suggest that tourism-led regional development should be accompanied by territorial strategies that strengthen connections between growth centers and peripheral rural areas.

Despite its contributions, this study has certain limitations. First, the analysis is limited to two observation years (2022 and 2024), which limits its ability to capture longer-term poverty trajectories and the temporal evolution of spatial patterns. Future research should therefore consider longitudinal studies with annual panel data to provide a more comprehensive understanding of poverty dynamics over time. Second, while this study maps village-level poverty patterns and interprets them through the sustainable rural livelihood approach (SRLA), it does not directly model tourism-related variables or household livelihood strategies. As a result, the analysis cannot fully explain the mechanisms through which tourism-led development affects poverty across different local contexts. Additional qualitative research, including interviews and case studies, would be valuable for uncovering the lived experiences of communities in persistent high-poverty clusters and for understanding how households, local governments, and community organizations navigate tourism-led change (Pradhan et al., 2017). Future studies should also examine the influence of external shocks, such as climate change and global market fluctuations, on spatial poverty dynamics. In addition, integrating more advanced approaches, such as machine learning with spatial econometrics, could improve the predictive modeling of poverty trends and strengthen the design of targeted policy interventions (Gawusu et al., 2026). Such efforts would deepen understanding of whether current development trajectories in West Manggarai can move from concentrated growth toward spatially just and sustainable poverty reduction.

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